

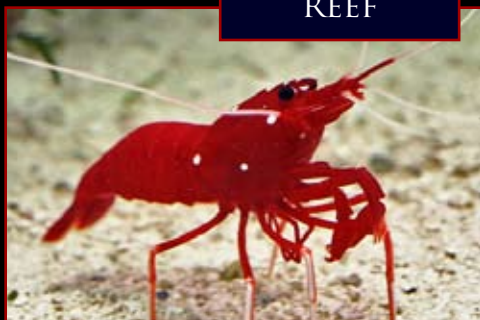
Redfish

AUGUST, 2012 (ISSUE #14)



THE SIMPLE, SUBLIME BEAUTY OF THE REDBREAST ACARA

REEF



Aaron discusses shrimp for the reef!

PEOPLE



We chat with Francis from Living Color

PLANTED

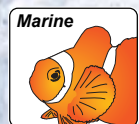
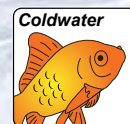


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Redfish Publishing. Pty Ltd.

PO Box 109 Berowra Heights,

NSW, Australia, 2082.

ACN: 151 463 759

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PO Box 109 Berowra Heights,
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ACN: 151 463 759

About Redfish

Redfish is a free-to-read magazine
for fishkeeping enthusiasts.

At Redfish we believe in the free exchange of information to facilitate success by aquarium and pond hobbyists. Each month Redfish Magazine will bring you dedicated sections on tropical, coldwater, marine and ponds.

Redfish was founded in early 2011 by Jessica Drake,
Nicole Sawyer, Julian Corlet and David Midgley.

We hope you enjoy this, the 14th issue of Redfish.

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Protomelas spilonotus - Photo Brian Gratwicke

POOR FISHERIES MANAGEMENT ENDANGERS SHARKS IN THE CORAL TRIANGLE

Hong Kong, China – WWF and TRAFIC today released a new report that shows the need for a more concerted effort in managing shark fisheries in the Coral Triangle, to help conserve dwindling populations of these threatened species.

The report, *An Overview of Shark Utilization in the Coral Triangle Region*, examines the catch, trade, and management of sharks in waters of the six Coral Triangle countries: Indonesia, Malaysia, Papua New Guinea, the Philippines, Solomon Islands, and Timor Leste, plus the neighbouring countries of Viet Nam and Fiji.

Indonesia and Malaysia are among the top 20 shark catching nations in the world—Indonesia being the single largest catcher.

“This report identifies crucial gaps in these countries’ implementation of management measures and data collection. In some cases this reflects inconsistency with basic requirements of the regional bodies and international conventions of which they are members,” says Glenn Sant, TRAFFIC Global Marine Programme Leader.

Key issues highlighted include the general absence of specific management measures for sharks, a lack of species identification in shark catch and trade reports, and the general lack of available data on both shark catch and trade across the region.

“A lack of data is detrimental to the sustainable management of sharks in the region and needs to be urgently addressed as sharks are heavily targeted in several of these countries,” adds Sant.

Some fisheries target sharks for their meat but the main driver of unsustainable fishing for sharks is currently the demand in Asia for fins, which are used in shark fin soup.

“The development of sustainable shark fisheries in this region has a long way to go. None of the countries can currently claim to be effectively and responsibly managing their shark resources,” says Sant.



Finned Grey Reef Shark, *Carcharhinus amblyrhynchos* thrown overboard.
Northern Cebu - Philippines
© Jürgen Freund / WWF-Canon



Large shark fins used as trophy display in Sheung Wan, Hong Kong.
© Jürgen Freund / WWF-Canon

The report encourages local and regional management bodies to examine the factors needed for responsible shark utilization.

“Responsible utilization of shark resources requires responsible management, trade, and consumption. Each of these elements requires adequate governance and monitoring to provide confidence that traded shark products are from sustainable sources,” adds Sant.

“The introduction of a comprehensive package of shark management measures must be a priority for these countries. Shark sanctuaries are an important component of this package as they provide an immediate and precautionary supplement to other management measures and, in particular, can provide much needed refuge and protected nursery areas for sharks,” says Andy Cornish, WWF-Hong Kong Conservation Director.

Despite long-standing global concerns on declining shark populations due to growing evidence that many shark species are threatened, shark populations continue to decline due to a general lack of even basic management, and the plight of sharks is further exacerbated by illegal, unreported, and unregulated fishing.

“This report shows how slow the development of sustainable fisheries has been in important areas where sharks are caught, and why WWF advocates that people should stop consuming shark fin and other parts, unless consumers can verify that a shark product is really coming from a sustainable source, notably with Marine Stewardship Council (MSC) certification. MSC is the only credible ecolabel currently available for wild capture fisheries, and there are only two MSC certified shark fisheries in the world” noted Cornish.

“The vast majority of shark products come from unsustainable sources, not just fins,” adds Cornish. “Sharks are also heavily traded for their meat, skin, and liver oil.”

Sharks play a very important role in coral reefs and other habitats, sitting at the top of the food chain, and help maintain the delicate balance of these marine ecosystems.

Of the 1,044 shark-related species, 181 are listed as threatened by IUCN, the International Union for Conservation of Nature, Red List, while 488 are classified as data deficient.

Download the full report at:
www.panda.org/coraltriangle/sharks ♣



Sharks fins laid out on the streets to dry with Chinese woman working trimming and cleaning fins before selling. Sheung Wan, Hong Kong.
© Jürgen Freund / WWF-Canon



Specialised shop selling sharks' fins. Beijing.
© Michel Gunther / WWF-Canon

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Today In The Fishroom

with Mo Devlin

Come on a tour of the
American Cichlid Association
convention!



Aquamojo

Text and photos by Mo Devlin

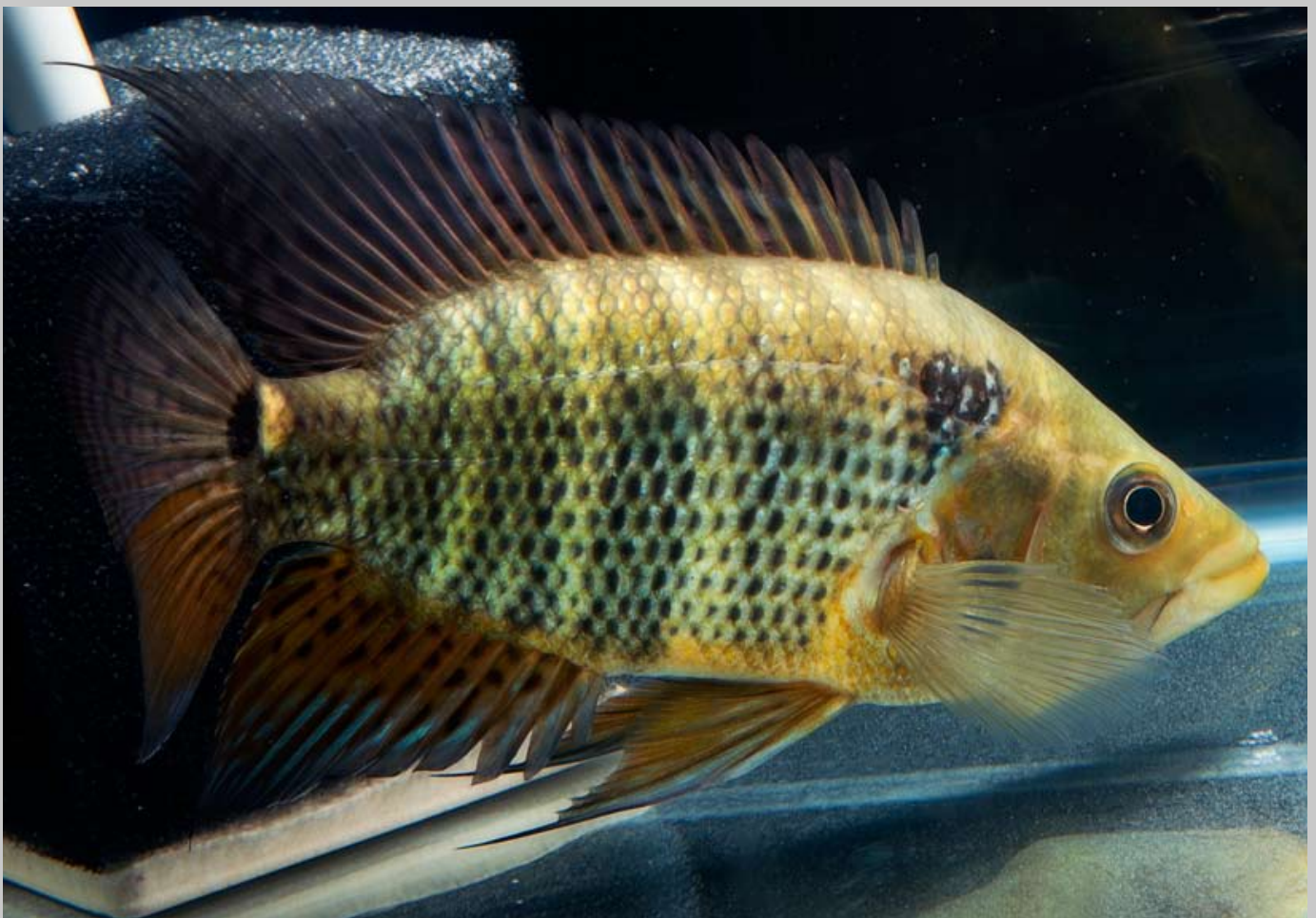
My favorite time of the year just flew by... July is cichlid month. Every year the American Cichlid Association along with a host Aquarium club stages a five day convention that brings "cichlidiots" from all over the country and various parts of the globe. This July the Circle City Aquarium Club hosted the convention in Indianapolis, Indiana. The basic format of the conventions are the same, but it always seems like THIS one was better than the BEST one last year.

This year was no different. Many well known names in the hobby were there giving excellent presentations that covered a wide variety of cichlid topics and categories. Ad Konings, Heiko Bleher, Dr. Paul Loiselle to name a few.

One of the most exciting things about a convention is not only being able to attend the presentations, but also meet the speakers in person. I spent an awesome couple of hours in the coffee shop having a conversation with Heiko about some of his adventures...and of course, photography. And from a photographer's prospective, seeing the images from his

presentation and those of Ad's, Dr. Loiselle and Anton Lamboj and the others...it was humbling. No convention is without its road trips. One memorable event was a side trip to the fish house....that's right...house...of cichlid legend Rusty Wessel. Rusty hosted a bus full of folks at his home in Louisville, Kentucky for the afternoon. Club members were treated to a cook out, and best of all, an afternoon with his fish. Rusty's fish house contains about 5000 gallons of water in 94 tanks. There are fifty-two windows providing natural sunlight with geothermal heating and air. Best of all, an automatic water changer does a 5% water change daily on large display tanks and 10% on small fry tanks. No buckets and hoses for this hobbyist. It is truly a hobbyist's dream.

No convention would be complete without the fish. A couple of hundred tanks were rented by fellow hobbyists selling and sharing some of their fish with convention attendees. Across the hall, national and local retailers were selling everything from driftwood and tank supplies, right down to fish food and apparel.



Best of Show winner - *Caquetaia krausii* "Rio Magdalena" entered by Dan Ye-Jennings



Children's tank decorating contest



Next generation of fish-keeping hobbyists.



Sienna Quinn happily decorating her tank entry

Throughout the week, various silent auctions, and of course the big Sunday auction were held. However one event that occurs every convention is anticipated by everyone. That's the Saturday auction hosted by a group of lovely ladies called the BITCHes (Babes In The Cichlid Hobby). Over the years this group of ladies have generated close to a hundred thousand dollars for the club, earmarked for research and cichlid conservation. The atmosphere of the auction is electric mixed with laughter, libation and of course, bags of fish.

One event that was both heartwarming and energized was the children's tank decorating contest. United Pet Group donated the tanks, vendors donated the fish and supplies. Close to thirty kids were given the opportunity to decorate their tank from start to finish, adding gravel, decorations and finally fish, competing to win best tank. From the looks on their faces and the atmosphere, they were all winners. More than one convention attendee observed and walked away beaming with a smile. After all, this was the next generation of hobbyists. All of the kids who participated were able to take their new tank home.

The actual fish competition was one of the best I have seen. The quality and selection of fish was spectacular. I have to admit that my interests were very much weighted to my affinity toward the Central American cichlids. However, as with most of these shows, you can't help walking away with a new found love and respect for many of the other "flavors" from around the world. In particular this year for this cichlid enthusiast was an intriguing peek at some of the Angelfish. Sure, I've seen them before, but hobbyist Harrison Storm entered a specimen called "Blue Ghost" that not only made me catch my breath but also won reserve best of show for the division.

Hobbyist Dan Ye Jennings swept the competition winning numerous first, second and even third place awards with her entries...many of which were my favorite, Central Americans. If you have never attended a show, and in particular, participated in a show, contemplate the process. You have to get the fish from your tank and transport them to the show, unscathed in prime condition. Judges look closely at the fish in the tank to see if it is missing scales, has torn or nicked fins, and the deport-



Reserve Best of Show - *Pseudocrenalibrus nicholsi* entered by Bobby Sutton

ment of the fish...how it is reacting in the tank. The move is challenging enough if you are bringing the fish a couple of miles. Dan Ye transported fifty entries over a thousand miles from her home in Colorado...a feat that deserves a medal by itself.

Overall there were 210 individual fish entries. Top awards went to:

- **Best of Show**

Caquetaia krausii "Rio Magdalena" entered by Dan Ye-Jennings

- **Reserve Best of Show**

Pseudocrenalibrus nicholsi entered by Bobby Sutton

- **Mike Sheridan Tankbuster Award**

Petenia splendida entered by Dan Ye-Jennings

- **Reserve Best of Show Ornamental Cichlids**

Blue Ghost entered by Harrison Storm

- **Best of Ornamental Cichlids**

Symphysodon discus entered by Florida Discus

- **C.A.R.E.S. Best of Show**

Pseudotropheus demasoni entered by Wendy Zorick



Reserve Best of Show Ornamental Cichlids - Blue Ghost entered by Harrison Storm



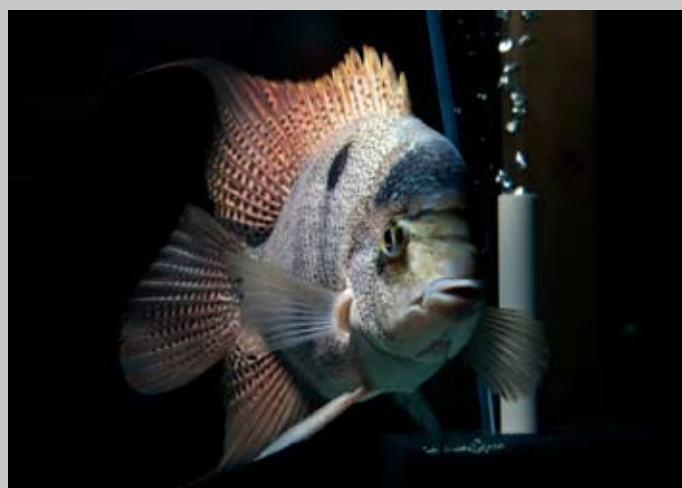
Rusty Wessel's substantial fishroom
Photo by Li from Monster Fish Keepers



Rusty Wessel's fishroom
Photo by Li from Monster Fish Keepers



Rusty Wessel's fishroom
Photo by Li from Monster Fish Keepers



Division A winner: *Vieja argentea*



Mike Sheridan Tankbuster Award: *Petenia splendida*
entered by Dan Ye-Jennings



Photography Winner - *Herichthys labridens* "Media Luna" entered by Mo Devlin

- **Photography:**

Herichthys labridens "Media Luna" entered by Mo Devlin

I am often asked, "what was the best part of the convention?" And regardless of how the convention's change...either location or content...my answer is the same. It's the people. Being able to share the experience of the hobby with so many like minded hobbyists is indescribable. I continue to meet both new and old friends at every convention I attend. It's a five day party...with cichlid fish. How much better can it get?

Next year's convention will be held in the mile high city of Denver, Colorado. Mark it on your calendar. For updates on next year's convention and additional information on this year's division winners, check out the American Cichlid Association's website at www.cichlid.org.



Best of Ornamental Cichlids - *Symphysodon discus* entered by Florida Discus



Trip to Russel Wessel's house - photo by Li from Monster Fish Keepers

ABOUT THE AUTHOR



Mo Devlin is the owner of Aquamojo.Com. He maintains three thousand gallons of fresh water tanks. Over his thirty years in the hobby he has successfully bred many of the Central and South American cichlid fishes. His passion for New World cichlids is only rivaled by his love of photography. Over the years, he has posted images of his collection frequently in his "Today in the Fishroom" series on line across many national and international fish forums. Mo has spent two terms on the board of trustees for the American Cichlid Assn, was chairman of the organization in 2010, and has been the Publicity chairman for the past decade.

FIRE IN THE TANK!

FIVE RED PLANTS FOR THE AQUASCAPE

by Meghan Helmer

In theme with the favoured colour of Redfish magazine, I have created a list of a few of the most beautiful red plants which exist in the aquascaping hobby. Red plants are often some of the most challenging to maintain in the planted tank due to requiring higher than normal levels of light, carbon dioxide, and specific nutrients depending on the plant. Frequently, this means the hobbyist must increase measuring and maintenance regimes in order to care for these plants. While providing the right environment may present a challenge, these stunning ruby plants add visual appeal to an aquascape which make them well worth the effort.

CABOMBA FURCATA COMMONLY KNOWN AS “RED CABOMBA”

This beautiful plant originates from South America, and like all *Cabomba* species, is favoured for its feathery, soft appearance. It typically has a golden colouration on the stem and lower leaves, and a pinkish frilled leaf at the top. Appropriate lighting in the aquarium should be moderate to high in intensity. Carbon dioxide injection is not necessary in order to keep *Cabomba*, but will assist with rapid growth. The temperature range which this plant can tolerate is between 22-32 degrees Celsius. *Cabomba furcata* is a stem plant, and as such, may be propagated by trimming off a portion of the top of the plant and then replanting it into the substrate. Trim-mings from this plant will grow new roots once planted in substrate. Be cautious when planting or trimming this plant, as the leaves are soft and prone to breakage. When all requirements are met, *C. furcata* can be an incredibly quick grower, and you may find you are quickly donating extra cuttings to your fellow hobbyists.

Due to its ability to grow quickly, in some countries plants of the *Cabomba* genus are considered to be an invasive species and their distribution is regulated or even banned. Make sure to check your local laws and never dispose of any aquatic plants in waterways or composts.

CRYPTOCORYNE WENDTII

Native to Sri Lanka, *Cryptocoryne wendtii* has become one of the most popular plants in the aquatic trade and hobby. While some varieties of *C. wendtii* do appear green, others such as the “red” variety appear in a deep, ruby hue. The leaves are spear in shape, and can often vary in length. At its longest, the leaves of this plant can grow to about 40 centimetres, but it is typically a slow grower and can be placed in the middle or the back of the tank. In aquascapes, it can often be used to imitate a fern in appearance, and looks excellent when placed near wood. What makes this particular plant a great addition to any tank is that it can tolerate a wide range of temperatures, from 22 to 28 degrees Celsius. It is also not very particular about the pH of the water, surviving in a range from 6.5 to 7.3. *C. wendtii* is not a very demanding plant for carbon dioxide, and can be grown successfully in tanks with no additional CO2 injection. Like most of the “crypt” species, *C. wendtii* can be highly sensitive to sudden aquarium transplants or drastic water parameter changes. These changes can cause a condition where the leaves of the plant deteriorate and melt, commonly known among hobbyists as “crypt rot” or “crypt melt”. While this can be a source of frustration to growers,



often the plant will recover and new leaves will form from the root base if left alone.

Once a *Cryptocoryne* plant has reached a large enough size it will begin to send runners into the substrate. Once these runners have a few leaves on them, they may be cut from the plant and replanted to grow separately.

LUDWIGIA REPENS

Ludwigia is a genus of plant which has a variety of really good looking red species to offer the plant enthusiast. One of the most vibrantly red coloured plants is the species *Ludwigia repens*, especially the 'rubin' variety. The plant is a slender, tall grower with a green colouration at the base and red on the top leaves. It is indigenous to North America, and some parts of South America. *L. repens* is a good choice for aquariums with a moderate intensity of lighting, but it will also thrive in high lighting as well. The optimal temperature range for *L. repens* is 23 to 26 degrees Celsius, and it can tolerate a wide pH range from 5.5 to 7.5. Due to its hardiness and ease of growth, it is a great choice for beginners, or someone looking for a lower maintenance, colourful plant.

Just like all stem plants, *L. repens* can be propagated by trimming off the top of the plant and replanting in the substrate. It will also send runners to grow new plants along the ground, if given the appropriate environment as described above. The maximum height that *L. repens* will grow is approximately 40 to 50 centimetres.



Underwater the leaves of *Ludwigia* are more rounded. Several colour forms are available that have varying amounts of red.

NESAEA CRASSICAULIS

This reddish brown stem plant has long, slender leaves with a blade-like appearance which will make a bold statement in a planted tank. It is native to Africa and prefers soft, acidic water with a pH range between 6.4 to 6.8. Carbon dioxide injection is also important for health and proper growth of this plant. Lighting should be suitably high in intensity, as this is extremely important to successfully maintain and grow *Nesaea crassicaulis*. Nutrient levels in the tank should be closely monitored and kept stable in order to promote good health and growth. The acceptable aquarium temperature range for *Nesaea crassicaulis* is 22 to 27 degrees Celsius.

Propagation is identical to the other stem plants in this article, however, when planting the stems make sure the plant has sufficient space so that leaves will not out-compete each other for light. This plant has the potential to grow to a maximum of 50 centimetres tall if not pruned back regularly.



the bright red foliage of *Nesaea pedicellata* at the rear of this planting. Photo by Luis Embalo (Ghostsword)

ABOUT THE AUTHOR

Meghan Helmer

Meghan Helmer has always had a passion for nature and fish keeping. Growing up around the lush green forests of British Columbia she developed an appreciation for the beauty and calmness that comes from being outdoors. Although she has always owned aquariums, she has recently been able to find an outlet for both of her passions in the art of aquascaping. She also currently manages the fish section of a local pet store.



though a little more challenging for beginners - and not described here for that reason - the various red lotus (*Nymphaea*) species are excellent choices for red colouration.

This is another stem plant which would look best situated in the middle or back of the aquascape, and should not be crowded by other tall plants.

ROTALA MACRANDRA

One of the most popular and sought after red plants in aquascaping is *Rotala macrandra*. The leaves are an intense red colour and when multiple stems are planted together, it gives the plant an appearance similar to that of a bright red bouquet of garden flowers. This flower effect is in part due to its soft petal-like leaves which almost mimic a rose.

It originates from Asia, and prefers temperatures between 22 to 27 Celsius and soft, acidic water. This is another plant where intense lighting is required in order for this plant to thrive, and carbon dioxide injection is also highly recommended. The maximum height for this plant is around 50 centimetres, which also makes it a good candidate for placement in the middle or back of the aquarium. This plant is another stem plant which can be propagated by planted trimmings. Adequate micro nutrients, especially iron, must be dosed in to the water column in order for the plant to thrive and to maintain its vibrant red hue. Due to its intense red colour, this plant can sometimes stand out too starkly in an aquascape, and would do well if complimented with other plants that are orange or golden in colour.

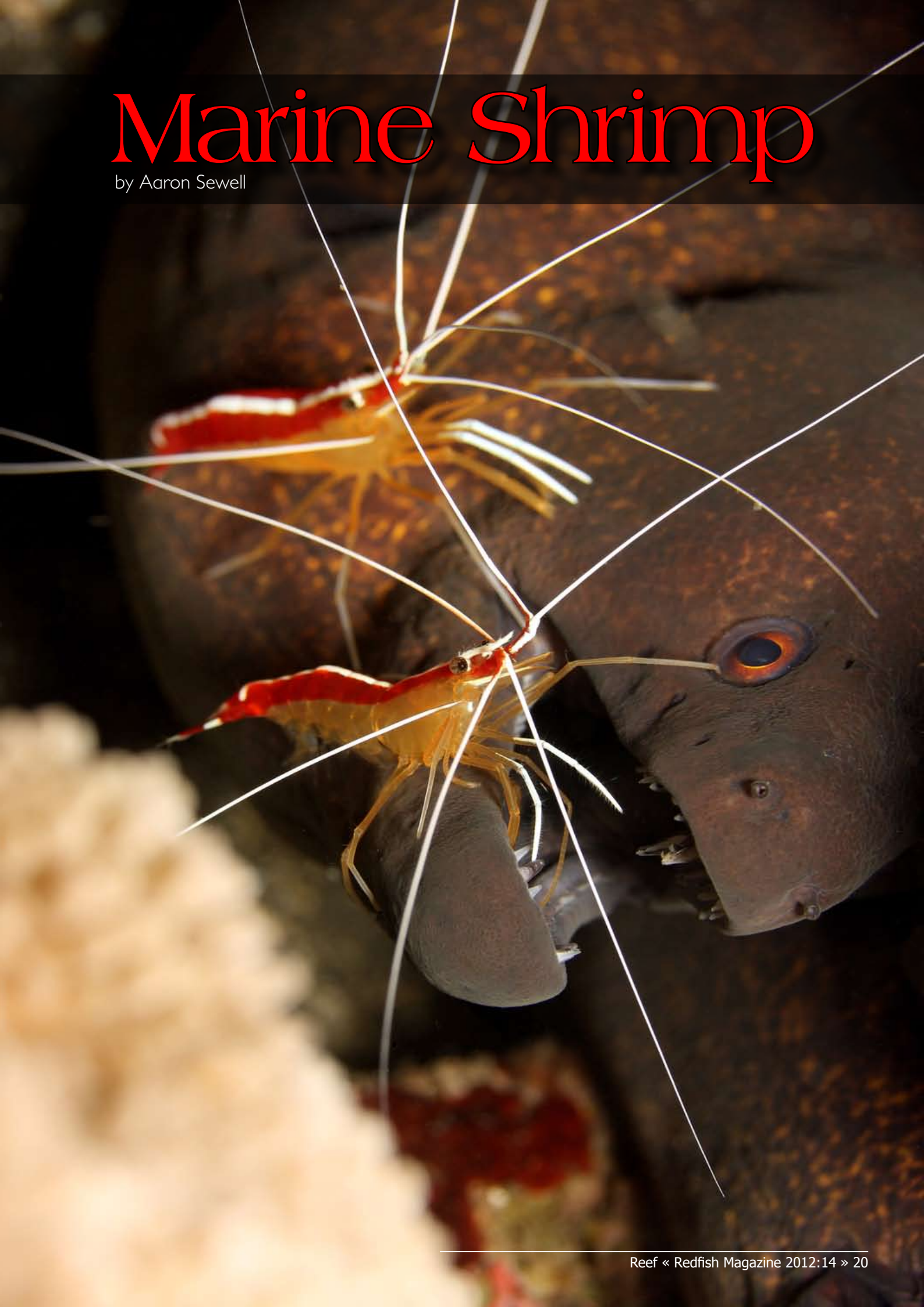


Superbly red, *Rotala macrandra* is an excellent choice for red colouration in a stem plant. Photo by Budi Lukman.

This is just a small sampling of some of the many red gems available to the hobbyist. For maximum effect in the aquascape, try to choose a variety of plants with different colours and shades, and stagger them throughout the aquarium. As a final note, the key to successfully aquascaping with red plants is to make sure the substrate is nutrient rich and the water column has appropriate levels of micro-nutrients and macro-nutrients. Regular measurement of water parameters is essential, but red plants often display nutrient deficits in their colouring, so keeping a keen eye on their colour will also help prevent further problems. Now that you are well read, why not try a little red in your aquascape?

Marine Shrimp

by Aaron Sewell



While the main focus of most marine aquariums are either fish or cnidarians (anemones, corals, soft corals, zoanthids, etc.), many include ornamental crustaceans to provide variety and subtle focus points. Crustaceans are also used in smaller aquariums as either an alternative to fish or in single species tanks. These crustaceans can vary from spiny lobsters (family Palinuridae) and dwarf reef lobsters (*Enoplametopus* spp.) to much smaller species such as porcelain crabs (*Neopetrolisthes* spp.) or anemone shrimp (*Periclimenes* spp.). Many species are brilliantly coloured while others are quite cryptic, some can be part of interesting symbiotic partnerships while others are free roaming and can provide interesting behavioural spectacles on their own. While many crustaceans are attractive and appear to make ideal additions to mixed reef aquaria, most are carnivorous predators and many can be a risk to other inhabitants within the aquarium.

This article will focus on the various ornamental marine shrimp that are commonly kept by aquarists. While the true shrimp belong to the infraorder Caridea, there are several groups also known as shrimp that fall outside this taxon. Coral banded shrimp belong to the closely related infraorder Stenopodidea while mantis shrimp belong to the more distantly related order Stomatopoda. Most commonly encountered crustaceans such as lobsters, crabs and true shrimp belong to the order Decapoda, identified by having 10 appendages (usually either 10 legs or 8 legs and 2 claws).

Most crustaceans are nocturnal and therefore in the home aquarium, they are often very secretive and may be rarely seen. For this reason, species that have a symbiotic relationship with sedentary partners, such as corals or anemones, are often good choices, especially in larger aquariums. There are however, several species of ornamental shrimp that will, in time, become confident in their surroundings and even in large aquaria, will become quite active, even to the point of climbing high in the tank at feeding time to compete with more active tank mates, especially fish.

Order: Stomatopoda

Stomatopods differ from decapods due to the possession of specialized appendages used for hunting as well as the lack of fused body segments and having eight pairs of thoracic appendages, known as thoracopods. Stomatopods are often divided into two groups by aquarists, “smashers” and “spearers”, by the type of hunting appendages they possess. While species within these genera are often considered to be pests, there are many species that are kept, often in single species aquaria, as ornamental species. While the “spearers” usually pose more threat to fish, the “smashers”, which are more often found in aquaria, can be problematic for other tank inhabitants such as molluscs, bristleworms and other crustaceans. The appendages used by mantis shrimp are very similar to those of the preying mantis giving rise to their common name. These appendages are raptorial limbs which are modified second thoracopods that are used in hunting and are known by aquarists as well as divers and



An array of beautifully illustrated decapods in *Kunstformen der Natur* (1904), plate 86.
By Ernst Haeckel (1834–1919)



a beautiful 'smashing' Mantis Shrimp in its burrow.
Photo by Silke Baron

researchers for their immense striking force. "Spearers" possess long, barbed spear-like appendages used to feed on soft bodied prey such as fish, whereas "smashers" have a large club shaped appendage as well as a secondary spear used largely to crack the shells of prey such as molluscs and crustaceans. The force of these appendages, which can reach speeds of around 23m/s, causes cavitation and a subsequent shock wave from the collapsing bubbles. This shock wave can be almost as harmful to prey, often causing death or stunning the prey, enabling a second strike.



Odontodactylidae/Conodactylidae (Mantis shrimp)

Both these families of mantis shrimp belong to the "smashers" group and contain most species kept by aquarists in single species aquaria. The gonodactylid family also includes most species found by aquarists hiding in live rock, causing often unnecessary concern for the aquarist. In a small aquarium on their own, these shrimp can be very fascinating creatures with often brilliant colours and interesting behaviour. Species such as the Peacock Mantis, *Odontodactylus scyllarus*, can

a 'spearer' type mantis shrimp.

grow quite large (up to around 20cm) and can be bold hunters making them ideal for single species aquaria. While most smashers are little threat to fish in an aquarium, larger species will pose a significant risk and smaller species can be a problem if other prey items are not available. If a clicking noise is heard from an aquarium, it will often be either a mantis shrimp or a pistol shrimp. If it is a mantis shrimp it is almost certainly a “smasher” and therefore of little threat to fish.

Order: Decapoda

This order is distinguished from other crustacean groups by both structure and reproductive behaviour. These crustaceans possess five pairs of pereopods (walking legs) which gives them their name and in some groups, one pair, usually the first, is modified into clawed arms known as chelipeds. Female decapod crustaceans carry their eggs within the pleopods then once the eggs have reached full term they are released by the female flicking her abdomen releasing the larvae into open water where they become plankton until they are old enough to settle onto the reef. Some species are easily bred in captivity and these tank raised individuals are sometimes offered to aquarists while the planktonic larval stage in most species is too long for them to currently be bred in captivity.

Infraorder: Stenopididea

This small group comprises of only two families and six genera, similar in appearance to both prawns (decapod subfamily: Dendrobranchiata) and shrimp (infraorder: Caridea) but are easily distinguished by the fact the third pereopod is modified as a cheliped instead of the first as in many other crustacean groups.



The most common species of Stenopus available to hobbyists is the Coral Banded Shrimp. Coral banded shrimp are mostly regarded as reef safe, however, they can and will eat small inverts and have been known to take small fish. Mix with caution.



Stenopidae (Coral shrimp)

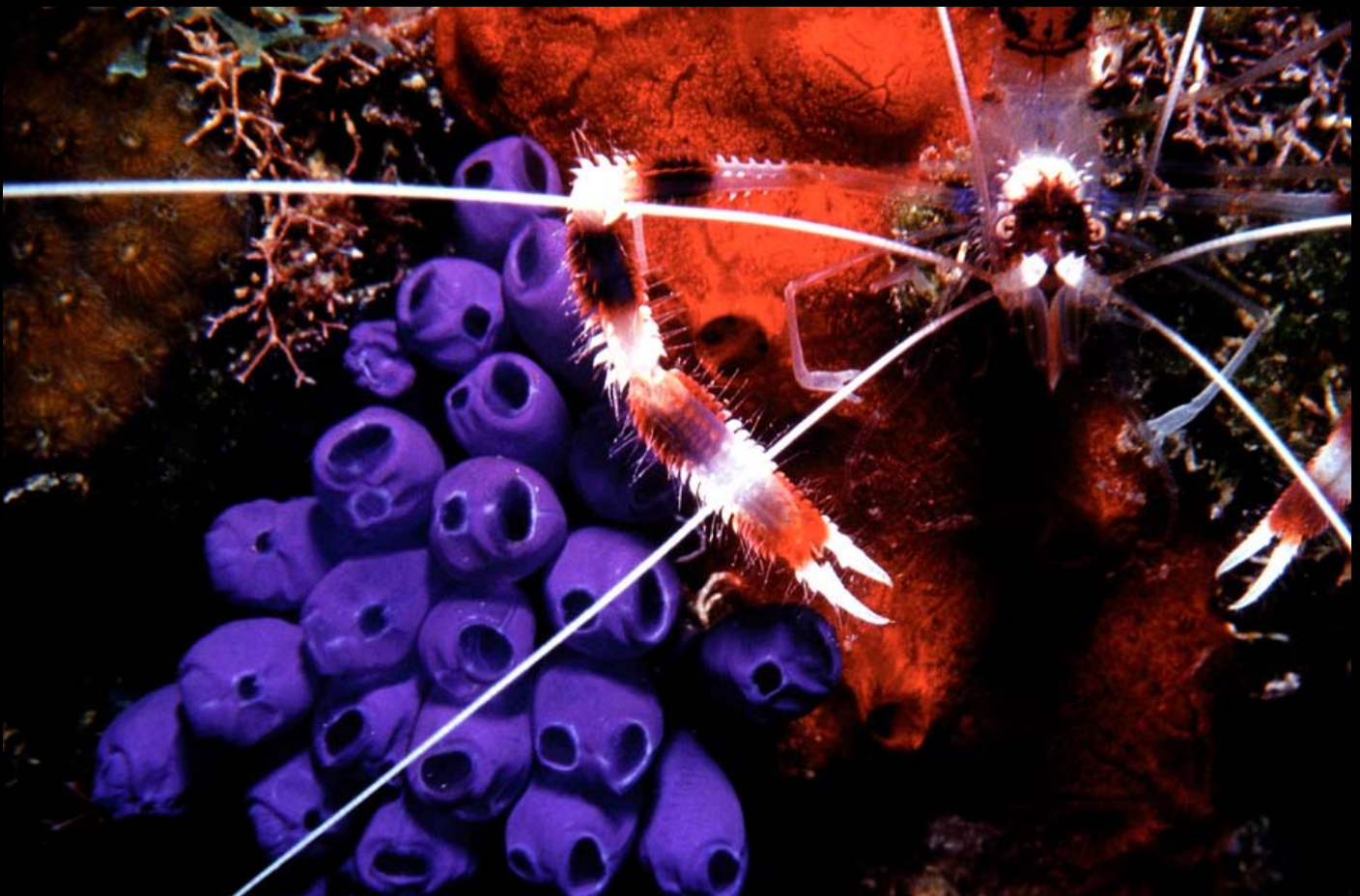
This family is represented in the aquarium trade largely by a single species, *Stenopus hispidus*, but there are several species from within the same genus that are kept by aquarists. These “shrimp” are carnivorous and feed largely on polychaete worms and small gastropods, this means that in an aquarium they may be a risk to populations of bristleworms, tubeworms and small snails such as *Nerites* or *Cerith* spp.. The diet of many stenopids also often includes algae and like many crustaceans, these creatures are also opportunistic scavengers. It must also be noted that these shrimp have the ability to take down small fish such as gobies or blennies.

The shrimp within the genus *Stenopus* are known as coral banded shrimp due to the white and orange/red banded pattern, best shown in *S. hispidus* and also known as boxing shrimp due to their long chelipeds and defensive behaviour. Variations to the banded pattern are found in many species such as the smaller *Stenopus tenuirostris* and *S. scutellatus* which have blue and gold carapaces respectively though both species still possess the white and orange bands along the remainder of the body, including the chelipeds. There are species such as the rare *S. pyrrsonotus* that vary from this banded pattern but are much less common in the aquarium trade. *Stenopus* spp. do not live peacefully with conspecifics of the same sex and because it can be difficult to sex these animals, it is recommended they be kept on their own unless they can be purchased as a pair or they are being added

ABOUT THE AUTHOR

Aaron Sewell

In 2004 Aaron completed a BSc (Marine Science) at the University of Sydney with majors in marine biology and tropical marine science. Since 2001 he has been involved with the aquarium industry at hobbyist and retail level and now works in aquarium product development. Aaron is a former committee member of the Marine Aquarium Society of Sydney and has collected fish and corals in Fiji for the US and European aquarium industries. Aaron has been writing for several local and international aquarium magazines since 2004.



to a very large aquarium.

The second genus within the family is *Odontozona* which is a group of deep water shrimp not often found in the aquarium trade and not kept as ornamental shrimp.

Infraorder: Caridea

While many groups of crustaceans are referred to as shrimp including mysis shrimp, mantis shrimp and prawns, the true shrimp belong to the infraorder Caridea. In some groups the first pair of pereopods are modified as chelipeds while in other groups this has not occurred. Many species of caridean shrimp have symbiotic relationships with other organisms including corals, anemones, molluscs and even fishes. In some cases this is a permanent relationship such as a *Periclimenes brevicarpalis* living within the tentacles of a *Stichodactyla mertensii* while some are short term such as *Lysmata amboinensis* removing parasites from a fish as it moves through a cleaning station. Many of these symbiotic relationships are present in aquariums despite the lack of necessity given the absence of potential predators and in the case of cleaner shrimp, even without obvious parasites and the lack of cleaning stations, they will climb aboard large fish such as surgeonfishes and angelfishes.



Hinge-beaked shrimp (*Rhynchocinetes* sp.).
Mariana Islands, Guam.

Rhynchocinetidae (Hingebeak shrimp)

Known by many names such as candy, camel, dancing and hingebeak shrimp, these small shrimp are colourful and peaceful animals that are popular and common in the aquarium trade. While they are no threat to fish or other crustaceans, these shrimp will usually feed on the tissue of corals, zoanthids, corallimorphs and soft corals. Due to this fact, these shrimp can be a useful tool in the eradication of pest anemones such as





Lysmata amboinensis walks across a rock covered in zoanthids.

Aiptasia spp. and *Anemonia majano*. Unlike many other shrimp, which fight with conspecifics, rhynchocinetids can be kept in small or large groups with little or no problems making them ideal for small or large aquaria. These shrimp possess small chelipeds used mainly for territorial battles and feeding purposes.

Hippolytidae (Cleaner/broken back shrimp)

This is a family of shrimp that contains several genera that are popular in the aquarium trade and in general, are easy to keep, peaceful species. Popular genera in this family include *Lysmata*, *Saron* and *Thor*.

The *Lysmata* spp. are sought after both for ornamental and functional purposes, with species such as *L. debelius* and *L. amboinensis* being very attractive and interactive shrimp while species such as *L. wurdemanni* considered an effective weapon against the nuisance anemone *Aiptasia*. The cleaner shrimp such as *L. amboinensis* and *L. debelius* will interact with fish in the aquarium as they would in the wild, climbing onto cooperative fish and removing parasites that may be present. While *Lysmata* spp. do not possess the chela that many crustaceans use to defend themselves, they are quite bold and will happily roam the tank



Lysmata debelius



Black moray (*Muraena augusti*) with a White-striped cleaner shrimp (*Lysmata grabhami*).

Photo by Philippe Guillaume

*Marbled Shrimp (Saron marmoratus) at
Christmas Island in Australia*



throughout the day once they are comfortable in their surroundings especially if they are kept in pairs, which is easy to do since all species are hermaphrodites. *Lysmata wurdemanni* are one of the species of shrimp currently bred in aquaria and often available to aquarists and as with all captive bred species, are a more sustainable and often more robust option to wild caught specimens.

Other shrimp in this family that are popular ornamental species include *Saron marmoratus* (Marble Shrimp) and *Thor amboinensis* (Sexy Shrimp) which are common and hardy shrimp. *S. marmoratus* is unlike any other species within the family as it is a destructive and aggressive shrimp that does not live peacefully with cnidarians or other crustaceans. It is not a species that lives in symbiosis with other animals nor does it have any traits that make it advantageous to the aquarium. For these reasons these shrimp are best kept in fish only aquariums with no other ornamental shrimp. *Thor amboinensis*, however, is a small (>1"), peaceful species that lives in a symbiotic relationship with anemones and corals such as *Heliofungia actiniformis*. This family also contains some small colourful shrimp such as *Lebbeus* spp. which are found primarily in temperate regions and are therefore of little interest to the aquarium industry. However, for the few aquarists that keep temperate aquariums, these shrimp would make excellent additions as they are similar to *Periclimenes* spp. in both colour and size.



the Sexy or Squat Shrimp (*Thor amboinensis*).

Palaemonidae

This is a very large family of shrimp which include many genera of freshwater prawns and marine shrimp as well as a couple of genera of ornamental marine shrimp such as *Periclimenes* and *Urocaridella*. Many species from this family are used by aquarists as "feeder shrimp" for other predatory creatures such as fish, cephalopods or other crustaceans, however, many aquarists will recognize the commensal species that live in association with anemones, nudibranchs, corals and other invertebrates. Aquarists may occasionally find species such as *Paranchistus ornatus* or *Anchistus* spp. living within the mantle cavity of *Tridacna* spp. clams.

Periclimenes spp. are often available in combination with anemones and occasionally are sold with the anemone unbeknownst to the retailer. One of the most common species available, *P. imperator*, can be found

in association with various organisms including the Spanish dancer nudibranch, *Hexabranhus sanguineus*, seastars, sea cucumbers and other nudibranch species. These small shrimp are often difficult to keep long term due to a variety of reasons including predation, competition and lack of suitable food. Some species feed on slime produced by their host, others are planktivores and some are a combination of these. Often available in pairs, these shrimp are quite peaceful and will often share hosts with other species such as anemonefishes.

Alpheidae (Pistol/snapping shrimp)

The genus *Alpheus* is the group with the main representation within the aquarium trade though there are several other genera within the family including *Synalpheus*, *Pterocaris* and *Yagerocaris*. An unusual group of shrimp are known as snapping shrimp due to the enlargement of one of the chela which can create a loud snapping or clicking sound used to potential predators or competitors. This clicking sound is a result of the large chela snapping rapidly which causes a cavitation bubble and subsequent shock wave similar to that of mantis shrimp. An interesting point about the enlarged chela is that if removed by a predator or competitor, the shrimp is able to reverse claws such that the smaller claw can grow and when the removed limb regrows the new claw becomes the smaller of the two.

Alpheus spp. are known well by both divers and aquarists for their symbiotic relationship with gobies such as *Amblyeleotris* spp., *Cryptocentrus* spp. and *Mahidolia* spp.. These shrimp are almost totally blind and this relationship benefits both parties by providing the shrimp with a pair of eyes to watch for predators and in return the shrimp builds a burrow for both shrimp and goby to live in. As the shrimp builds the burrow it keeps a single antenna on the goby and if the goby moves suddenly, the shrimp will retreat into the hole with the goby following close behind.

Gnathophyllidae (Harlequin shrimp)

While there are several genera within this family, the only genus of interest to the aquarium trade is the genus *Hymenocera*. The *Hymenocera* spp. are some of the most attractive shrimp available but are also some of the most difficult to keep due to their diet. These shrimp require the ambulacral system of echinoderms such as Asterooids (sea stars) and Echinoids (urchins) as part of their diet. These shrimp are only small but they have the ability to move much larger seastars into caves where they turn the star over and feed on the tube feet of their prey. In the aquarium, it is difficult to obtain a consistent supply of seastars to support the feeding of these shrimp and it is essential this is considered before their purchase. It is possible to obtain seastars that will reproduce by fission and are often considered to be pests in the reef



Emperor Shrimp (*Periclimenes imperator*)

Photo by Steve Childs



Amblyeleotris yanoi and *Alpheus randalli*.

Photo by Steve Childs



Vir philippinensis on *Plerogyra sinuosa*

Photo by Steve Childs

aquarium. It would be ideal to house these in a separate aquarium and allowed to reproduce to numbers that will make feeding sustainable. Unfortunately these shrimp are very rare in the trade and as a result they attract very high prices keeping them out of reach of the average hobbyist.

While care must be taken with the compatibility of shrimp with other aquarium inhabitants, many of these fascinating creatures make excellent additions to both large reef aquaria as well as smaller nano reefs and single species aquaria. While it should be obvious to most aquarists that it is best to avoid mixing ornamental crustaceans with large predators such as scorpionfishes (Scorpaenidae), groupers (Serranidae) and triggerfishes (Ballistidae), care should be taken when mixing crustaceans with smaller “reef safe” fish such as wrasses (Labridae), dottybacks (Pseudochromidae) and hawkfishes (Cirrhitidae) as they are often specialized crustacean predators. It must also be noted that when adding species that live symbiotic partnerships with anemones, such as *Periclimenes* shrimp, it may or may not be possible to keep them with anemonefish. Usually the fish and crustaceans will live harmoniously but they must be watched when first introduced as there will often be some initial conflict.

The diet of the individual species must always be considered before being added to the aquarium. All crustaceans will routinely shed their exoskeleton as they grow and it is recommended that the discarded moult is left in the aquarium as the animal will feed on it because it contains necessary elements such as iodine that will aid in the strengthening of the new exoskeleton. Feeding these animals a diet that includes brine shrimp or mysis shrimp will also help them acquire the necessary elements for healthy growth and repair. It is believed by many aquarists that iodine dosing is required for the healthy growth and replacement of exoskeletons in crustaceans but this is not true, sufficient nutrients should be attained through correct diet.

Care should also be taken when adding different shrimp species to the same aquarium. All crustaceans are either carnivores or omnivores and most will feed on fellow crustaceans if the opportunity arises, even to the point that some are cannibalistic. Even if two species are seen together in an aquarium, this does not mean the combination will always work, especially if it is attempted in a smaller aquarium. It is not uncommon for aquarists to keep *Lysmata amboinensis* with *Stenopus hispidus* but in some cases the latter can become aggressive and kill the smaller less aggressive shrimp. In some cases such as with some stenopids, other crustaceans are a preferred prey item and they should not be kept together under any circumstances.



Harlequin shrimps require live starfish as part of their diet.

THE SIMPLE, SUBLIME BEAUTY OF THE REDBREAST ACARA

Name: *Laetacara dorsigera*

Common name: Redbreast Acara, Smiling Acara

Family: Cichlidae

Maximum size: 6-8cm

Origin: Endemic to South America in the Amazon River basin. Collections exist for the Guaporé River drainage, Paraná River basin in Argentina, Brazil and Paraguay.

Aquarium: The species is small-growing and relatively peaceful. A pair can be easily housed in a 40-80L aquarium. The aquarium should be densely planted and the water neutral to acidic in pH. The use of driftwood in the aquarium is useful in water conditioning. Depending on the size of the aquarium, the number of "dither" fish should be varied as these assist in preventing these small cichlids from becoming too shy. Mountain Cloud Minnows (*Tanichthys albonubes*) make an excellent choice that are hardy and won't bother fry. Prepared foods

are readily accepted, though aquarists interested in breeding should condition suitable pairs with frozen foods to ensure optimum health.

Similar species: *Laetacara curviceps*, *L. araguaiae* (Buckelkopf), *L. flavilabris*, *L. thayeri* and *L. fulvipinnis* (Orangeflossen) are sometimes offered to hobbyists.

Breeding: Like its care, the species is relatively straightforward to breed. Good stock are important, be sure you have high quality fish of known origin before you undertake breeding. The species is a typical cichlid open-spawner with advanced brood care. The pair will clean a rock or wood surface and lay their eggs. Post hatching the parents will often move fry to a shallow depression in the gravel. Once free-swimming the fry are easy to feed on microworms or baby brine shrimp. Parental care can be a bit fickle (particularly with new parents). Watch for signs of disinterest in the parents, or an interest in spawning again before removing the parents.



REDFISH INTERVIEWS

Francis Yupangco

To aquarists familiar with National Geographic's TV series "Fish Tank Kings" Francis Yupangco needs no introduction. Francis has been keeping, selling or involved with fish tanks for most of his life. Redfish was lucky enough to sit down and have a chat with Francis about how he got to where he is, and about his interest in aquariums.

Francis began his fishkeeping career very young with a Betta, his interest in fish was such that by age 14 he was working at local fish shop in Vancouver, Canada - his hometown. At 17 he was headhunted by Vancouver Aquarium, where he worked as a aquarist, researcher and marine biologist - mentored by Dr. Dr. Jeffrey Burton Marliave, an acknowledged expert on ichthyoplankton. We asked Francis about his roles after leaving Vancouver:

'After 7 years at Vancouver Aquarium I moved to Saudi Arabia and worked for a company called Issham Aquatics, the largest exporter of Red Sea marine fish in the world.'

It was this time in Saudi Arabia that Yupangco got a taste of project management and large scale constructions. Asked about his time in Saudi Arabia, Francis said:

'I was the project manager for the first public aquarium in Saudia Arabia' in the gulf coast city of Al-Khobar. 'It was a lot of fun and we got build a fabulous public aquarium (Prince Sultan Science centre or SciTech for short)' this was a big change to his past experience in animal husbandry, in Francis' words he went from 'being an aquariast and taking care of animals, to now organising contractors, making sure acrylic was installed properly etc. It was quite a trial by fire. Generally you would start with a small project and slowly move up but I went straight into a big project.' There were 'lots of sleepless nights but it turned out well, opened on time and was a huge success'.

After completing SciTech, Francis received an opportunity he couldnt turn down. It was an opportunity with Issham Aquatics to 'build a 2,500 gallon coral tank on a yacht which was a cool challenge. Gallon for gallon its probably the most expensive tank in the world.' There is a 'lot of complex technology in it' and to test it, Francis said he got to 'Sail from Nice to Egypt in terrible conditions' and while he got seasick the tank thrived. Kevin Erickson, an Ameri-



can biologist who was doing his PhD in Australia, was hired to take care of the yacht's live coral tank full time.

After this, Yupangco took up a position as Director of Operations for Issham Aquatics.

'Issham Aquatics is a huge public aquarium contruction and operation company in the Middle East. At the moment there are 6 or 7 public aquariums in the Middle East and I believe Issham built all of them.' By now aged 27, Yupangco led a staff of 200 and built some amazing systems including *'the world's largest residential aquarium of half a million gallons in Riad, an aquarium in the middle of the desert with a 60 foot long tunnel, 8000 fish, 35 sharks and a dozen stingrays.'*

We asked Francis how his association with Living Color began and he said *'we were puchasing a lot of corals from Living Color. I approached Mat (Mat Roy, President of Living Color) and asked if he would be interested in forming a joint venture. We formed Living Color Dubai, a successful collaboration between Living Color and Issham Aquatics.'*

After living abroad for over 5 years, Yupangco said that he wanted to move closer to home/family in North America, and *'I accepted a job with Living Color, where I've been for 3 years now.'* Living Color's based near Miami, Florida. *'A location that features great diving, is the heart of aquaculture in the USA as it's the perfect temperature'.*

Francis describes Living Color's undertakings as *'... a purely design and manufacturing company. We do approximately 70% commerical public aquarium work and ~30% high end residential installations. All work is custom made, every tank is unique. In a busy year we do around 100 tanks'* he said.

Living color began working with National Geographic to produce 'Fish Tank Kings' and went on to work with many public aquariums which were documented in the first season of the show. They built a giant octopus aquarium for Tennessee Aquarium, for example.

When asked about his favourite installation, Francis said he had just visited it that day, an installation for the Conservency of Southwest Florida. This was a collaboration with Cambridge Seven, in his words *'the best architecture and designers in the field'*. In the two years he had been working on the installation, he had been involved mainly in design and quality control in the factory, so today had been the first time he had got to see the aquarium on site. This was the largest project they had done with Cambridge Seven and *'worked out to be amazing'*.

When asked about how the skills and knowledge aquired as a fish tank hobbyist, working in a retail pet store help him in his current role designing multimillion dollar aquariums, Franis said that the basic biological pricipals are important to know and understand in order to scale up and build large exhibits. He said *'think about your own tank in which you need to clean the gravel...when we designed the project in Riyadh, Saudi Arabia, I designed an integrated system, whereby we could plug in giant hoses to vaccuum the gravel underwater with divers...all the basic fundamentals learned maintaining small aquariums are transferable'*.

Francis told us that he primarily designs marine set-ups, however, he did design one freshwater system, a Lake Malawai tank, which was featured on Fish Tank Kings. He was able to take viewers on a tour of a fish farm which was the largest breeder of African Cichlids in the world. He went on to tell us that his favourite freshwater species is Discus and that he bred them when he was in high school. He said he would love to do a planted aquarium for the

show, however, most clients are interested in marine systems.

Redfish Magazine asked Francis the all important question of whether he still has a fish tank at home. As we suspected, he agreed that it was a bit like taking your work home, so the last aquarium he had was when he was in university back in 2000. We're pleased to report he did recently succumb at least a little and currently has a nano reef aquarium on his desk with aquacultured coral, fish and shrimp.

Francis went on to talk about his passion for fishkeeping:

'I've been a lifelong fishkeeper, and I really want to see the fish hobby thrive'. 'I think it's a great tool to teach children about the environment'.

Francis said he had been approached by animal activists in the past, and people who were concerned about keeping fish in captivity. In response, Francis said *'I say that people care about things they know. If they don't keep them first, they won't learn and care about the marine environment'. 'Many people who live in countries of a large landmass, like the US and Australia, may never get to see the ocean, or go diving, so what better way to show them than having a public aquarium so they can see these animals'....'allow them to develop an emotional connection with them so they are more likely to protect them'.*

Redfish Magazine would like to thank Francis for taking the time to talk to us and wish him further success in his designing endeavours in the future.



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Salty Tank
American Livebearer Association
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<http://usafishbox.forumotion.com/>

CANADA

Betta Breeders Canada

<http://www.bettabreederscanada.com/>

Alberta

Calgary Aquarium Society
Edmonton Aquarium Club

<http://www.calgaryaquariumsociety.com/>
<http://www.fish-club.org/>

British Columbia

Vancouver Aquatic Hobbyist Society
Wet Coast Aquarium Society

<http://vahs.ca/>
<http://wetcoastaquariumsociety.ca/wetcoast/>

Ontario

Brampton Aquarium Club
Peel Aquarium Club
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Chatham-Kent Aquarium Society
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Durham Region Aquarium Society
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London Aquarium Society
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Toronto Willowdale Aquarium Society

<http://www.bac-on.org/>
<http://www.peelaquariumclub.org/>
<http://www.brantaquariumsociety.ca/>
<http://www.cichlidae.com/forum/viewforum.php?f=103>
<http://www.scaas.info/index.html>
<http://www.dras.ca/>
<http://ovas.ca/>
<http://www3.sympatico.ca/ps.mcfarlane/home.htm>
<http://www.freewebs.com/fcpc/>
<http://www.kwas.ca/>
<http://www.londonaquariumsociety.com/>
<http://www.geocities.com/sarniaaquariumsociety/>
<http://www.torontoaquarium.org/>

Manitoba

Aquarium Society of Winnipeg

<http://www.asw.ca/>

Nova Scotia

East Coast Aquarium Society

<http://www.eastcoastaquariumsociety.ca/forum/>

Saskatchewan

Saskatoon Aquarium Society
Regina Aquarium Society

<http://www.saskatoonaquarium.com/>
<http://www.reginaaquariumsociety.ca/>

Quebec

Montreal Aquarium Society
La Societe des Aquariophilie de Montreal
Ass. Reg. des Aquariophiles de Quebec

<http://www.geocities.com/mtlfishclub/index.html>
<http://www.aquasam.qc.ca/>
<http://www.oricom.ca/pierdes/>

UNITED STATES OF AMERICA

Alaska

Juneau Aquarium Society

<http://www.taursys.com/kasha/JAS/>

Arizona

Dry Wash Aquarium Society

<http://www.drywashaquarium.org/>

California

Bakersfield Koi & Water garden Society
Desert Fish Club
Sacramento Aquarium Society
San Francisco Aquarium Society
Silicon Valley Aquarium Society
Santa Clara Valley Koi and Water Garden Club
San Diego Tropical Fish Society
Pacific Coast Cichlid Association

<http://www.bakersfieldkoidclub.com/>
<http://www.desertfishclub.com>
<http://www.sacramentoaquariumsociety.org/>
<http://www.sfaquarium.org/>
<http://www.tactics.com/d/svas/>
<http://www.sckoi.com/>
<http://www.geocities.com/sandiegofishfan/>
<http://www.cichlidworld.com/>

Colorado

Southern Colorado Aquarium Society
Colorado Aquarium Society
Rocky Mountain Cichlid Association

<http://www.southerncoloradoaquariumsociety.com/>
<http://www.coloradoaquarium.org>
<http://www.liss.olm.net/rmca/>

Connecticut

Aqua-Land Aquatic Society
Exotic Fish Society of Hartford Inc.
Norwalk Aquarium Society

<http://pages.cthome.net/vito/>
<http://users.rcn.com/wmercet/>
<http://www.castaways56.supanet.com/>

Florida

Gold Coast Aquarium Society South Florida
Tampa Bay Aquarium Society

<http://www.gcassf.org/Home.htm>
<http://www.tbas1.com/>

Georgia

Atlanta Area Aquarium Society

<http://atlantaaquarium.com/>

Hawaii

Honolulu Aquarium Society

<http://www.geocities.com/Heartland/Meadows/2948/HASF.html>

Illinois

Champaign Area Fish Exchange
Chicagoland Marine Aquarium Society
Planted Aquarium Club of Chicago
Tri-County Tropical Fish Society
Greater Chicago Cichlid Association
Rockford Reefers Aquarium Club

Indiana

Circle City Aquarium Club, Inc.
Indiana Marine Aquarium Society
Michiana Aquarium Society

Iowa

Eastern Iowa Aquarium Association
Iowa Aquarium Society
Greater Iowa Reef Society

Kentucky

Greater Louisville Koi & Goldfish Society
Louisville Marine Aquarium Society

Maine

Great Lakes Aquarium Society
Worcester Aquarium Society

Massachusetts

Boston Aquarium Society
Pioneer Valley Aquarium Society
Worcester Aquarium Society

Michigan

The Aquarium Society of Ann Arbor
Grand Valley Aquarium Club
Southwestern Michigan Aquarium Society
Motor City Aquarium Society
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Metro Detroit Aquarium Clubs
Upp. Peninsula of Michigan Marine Aq. Soc.
Marinelife Aquarium Society of Michigan

Minnesota

Minnesota Aquarium Society
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Missouri

Missouri Aquarium Society
Heart of America Aquarium Society

New Hampshire

New Hampshire Aquarium Society

New Jersey

Jersey Shore Aquarium Society
North Jersey Aquarium Society

New York

Greater City Aquarium Society
Brooklyn Aquarium Society
Allegheny River Valley Aquarium Society
Long Island Aquarium Society
Central New York Aquarium Society
Nassau County Aquarium Society
Danbury Area Aquarium Society
Tropical Fish Club of Erie County

North Carolina

Raleigh Aquarium Society
Cape Fear Aquarium Society

Ohio

Stark County Aqua Life Enthusiasts
Greater Cincinnati Aquarium Society
Cleveland Aquarium Society
Ohio Cichlid Association
Greater Akron Aquarium Society
Medina County Aquarium Society
Youngstown Area Tropical Fish Society
Ashtabula County Aquarium Club
Lorain County Aquarium Society
Columbus Area Fish Enthusiasts

Oklahoma

Oklahoma Aquarium Association

<http://www.champaignfish.com/>
<http://www.cmas.net/>
<http://www.pacchicago.org/>
<http://aquariumhobbyist.com/tctfs/index.html>
<http://www.gcca.net>
<http://www.rockfordreefersaquariumclub.org/>

<http://www.circlecityaqclub.org>
<http://indmas.org>
<http://michianaaquariumsociety.org/>

<http://www.eiaainfo.org/>
<http://www.iowaaquaria.com/>
<http://www.greateriowareefsociety.org/>

<http://www.louisvillekoidclub.com/>
<http://www.lmas.org/joomla/>

<http://www.glaquarium.org/>
<http://www.petsforum.com/was/>

<http://www.bostonaquariumsociety.org/>
<http://www.pvas.net/html/>
<http://www.petsforum.com/was/>

<http://sitemaker.umich.edu/aquarium.society>
<http://www.grandvalleyaquariumclub.org>
<http://www.swmas.org/>
<http://home.att.net/%7ecr.newell/clubs/page2.html>
<http://www.greaterdetroitaquariumsociety.com/>
<http://home.att.net/~c.r.newell/clubs/>
<http://www.upmmas.com/>
<http://www.masn.org/>

<http://www.mn-aquarium.org/>
<http://www.geocities.com/fmaquarium/>

<http://www.MissouriAquariumSociety.com>
<http://www.kcfishclub.org/>

<http://www.nhaquariumsociety.com/index.htm>

<http://www.jerseyshoreas.org/>
<http://www.njas.net/>

<http://ourworld.compuserve.com/homepages/greatercity/>
<http://www.basny.org/>
<http://www.orgsites.com/ny/arvas>
<http://www.liasonline.org>
<http://www.cnyas.org/>
<http://www.ncasweb.org>
<http://northeastcouncil.org/daas/index.html>
<http://tfcec.tripod.com/tfcecwebsite/>

<http://www.fishclubs.com/nc/ras/main.html>
<http://capefearaquariumsociety.com/>

<http://www.scalesclub.com/>
<http://www.gcas.org/>
<http://www.clevelandaquariumsociety.org>
<http://www.ohiocichlid.com/>
<http://www.gaas-fish.net>
<http://www.geocities.com/MCASfish/>
<http://www.yatfs.com/>
<http://www.geocities.com/Heartland/Park/6982/index.html>
<http://geocities.com/RainForest/Andes/3049/>
<http://www.columbusfishclub.org/>

<http://petsforum.com/okcaa/>

Oregon

Greater Portland Aquarium Society

<http://www.gpas.org/>

Pennsylvania

Bucks County Aquarium Society

<http://www.bcasonline.com/>

Pennsylvania (cont)

Delaware County Aquarium Society

<http://www.dcas.us>

International Betta Congress

<http://ibcbettas.com/>

Aquarium Club of Lancaster County

<http://www.adlc.us/>

Northeast Philadelphia Aquarium Society

<http://www.phillyfishclub.com/>

Greater Pittsburgh Aquarium Society, Inc.

<http://www.gpasi.org>

Pittsburgh Marine Aquarium Society

<http://www.pmasi.org/frm/>

Erie Aquarium Society

<http://groups.yahoo.com/group/ErieAquariumSociety/>

Rhode Island

Tropical Fish Society of Rhode Island

<http://www.tfsri.org/>

South Carolina

Myrtle Beach Aquarium Club

<http://www.facebook.com/pages/Myrtle-Beach-Aquarium-Club/402263799688>

Tennessee

Putnam County Aquaiurm Society

<http://www.pcaquarium.org>

West Tennessee Marine & Reef Aquarium Club

<http://www.wtmrac.com/>

Texas

Federation of Texas Aquarium Societies

<http://www.fotaswebsite.org/>

Capital Aquarium Society of Texas

<http://www.petsforum.com/cas/>

Dallas/Ft. Worth Aquatic Plant Club

<http://www.aquatic-plants.org/>

North Texas Water Garden Society

<http://www.ntwgs.org/>

Utah

Great Salt Lake Aquarium Society

<http://fancyguppy.50megs.com/custom2.html>

Wasatch Marine Aquarium Society

<http://www.utahreefs.com/>

Vermont

Black River Aquarium Society

<http://www.angelfire.com/vt/brasvt/>

Virginia

Potomac Valley Aquarium Society

<http://www.pvas.com/pvasindex.htm>

Washington

Bellingham Aquarium Society

<http://www.facebook.com/pages/Bellingham-Aquarium-Society/112557868810416>

Greater Seattle Aquarium Society

<http://www.gsas.org/>

Kitsap Aquarium Society

<http://www.geocities.com/Petsburgh/5640/kastoc.htm>

Washington Koi and Water Garden Society

<http://www.washingtonkoi.org/>

Wisconsin

Milwaukee Aquarium Society

<http://fishclubs.com/WI/MAS/>

Green Bay Aquarium Society

<http://www.gbasonline.org/gbashome.htm>

Central Wisconsin Aquarium Society

<http://www.cwas.org/>

PUERTO RICO

Asoci. de Acuaristas de Aguadilla

<http://coqui.metro.inter.edu/acuaristas/aaa.html>

Acuarista Metro Este

<http://www.amepr.org/>

BERMUDA

Bermuda Fry-Angle Aquarium Society

<http://www.fryangle.com/>

BRAZIL

Aquaflux Aquarismo e Aquapaisagismo

<http://www.aquaflux.com.br>

Aqualinea

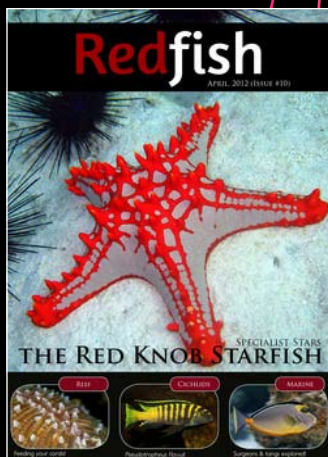
<http://aqualinea.com.br/blog/>



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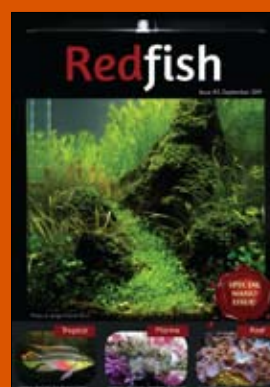
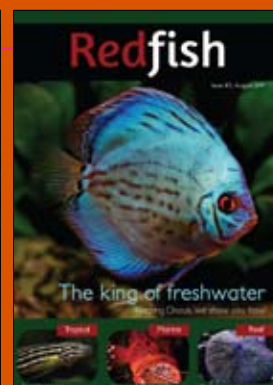
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PO Box 109, Berowra Heights,
NSW, Australia. 2082.
ABN: 151 463 759